

What is claimed is:

1. A method of maintaining proximity information in an overlay network, wherein the overlay network is a logical representation of a physical network, the method comprising:

5 determining whether a network condition occurred, the network condition being associated with a region in the overlay network;

storing a proximity information in the region, wherein the proximity information includes locations of nodes physically close in the physical network

10 updating the proximity information stored in the region if a change associated with the nodes physically close in the physical network occurred; and

transmitting the proximity information to a first node operable to route a message to the region in response to the network condition occurring.

2. The method of claim 1, further comprising:

15 selecting a routing node in the region based on the proximity information transmitted to the first node;

determining whether the selected routing node is different than a previously selected routing node for the region; and

20 placing the selected routing node in a routing table for the first node in response to the selected routing node being different than the previously selected routing node.

3. The method of claim 2, wherein selecting a routing node comprises identifying a node in the region physically closest to the first node based on the proximity information transmitted to the first node.

5 4. The method of claim 1, wherein the network condition comprises one or more of a predetermined number of nodes joining the region; a predetermined number of nodes departing from the region; a lapsing of a predetermined period of time, a load of a node in the region exceeding a threshold or falling below a threshold, and a forward capacity of the node in the region falling below a threshold.

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5. The method of claim 1, further comprising the first node identifying the network condition to be monitored.

15 6. The method of claim 1, further comprising generating the proximity information stored in the region by determining distances of substantially all the nodes in the overlay network to landmark nodes.

7. The method of claim 1, wherein storing the proximity information further comprises:

20 determining points in the overlay network used to store the proximity information by mapping the locations of the nodes physically close in the physical network to points logically close in the overlay network using a space-filling curve.

8. The method of claim 1, wherein transmitting the proximity information further comprises transmitting at least one measured network metric for a node in the region and the proximity information to the first node.

5 9. The method of claim 8, further comprising selecting a routing node for the region based on one or more of the at least one measured network metric and the proximity information.

10 10. A method comprising: ✓
selecting a target node in a region in an overlay network, the overlay network being a logical representation of a physical network;
determining a network condition to be monitored by the target node; and
receiving a notification from the target node including a map for the region, wherein the map includes locations of nodes physically close in the physical network,
15 in response to the target node detecting the network condition.

11. The method of claim 10, wherein the notification further comprises at least one network metric associated with the target node.

20 12. The method of claim 11, wherein the network metric comprises at least one of nodes joining the region; nodes departing from the region; a lapsing of a predetermined period of time, a load of the target node, and a forward capacity of the target node.

13. The method of claim 11, further comprising determining a routing node for the region based on at least one of the map and the at least one network metric.

5 14. The method of claim 13, wherein determining a routing node for the region further comprises:

determining a physically closest node closest to a source node in the physical network based on the map; and

selecting the physically node as a routing node for the region.

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15. A system comprises a plurality of nodes connected via at least one network, wherein an overlay network logically represents the system, the system comprising:

a target node in a target region in the overlay network, the target node being operable to determine whether a predetermined network condition occurred and transmit a notification to a source node in response to the network condition occurring; and

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the source node being operable to receive the notification and select a routing node in the target region based on the received notification, wherein the received notification includes a map comprising locations of nodes physically close in the physical network.

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16. The system of claim 15, wherein the routing node is a node in the target region physically closest to the source node.

17. The system of claim 15, wherein the notification comprises at least one network metric measured by the target node, the source node being operable to select the routing node based on the at least one network metric.

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18. The system of claim 17, wherein the at least one network metric comprises at least one of nodes joining the target region; nodes departing from the target region; a lapsing of a predetermined period of time, a load of the target node, and a forward capacity of the target node.

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19. The system of claim 15, wherein the source node is operable to transmit a message to the target node identifying the network condition.

20. The system of claim 15, wherein the overlay network comprises a distributed hash table overlay network.

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21. The system of claim 20, wherein the overlay network comprises an eCAN overlay network, and the source node is an expressway routing node operable to select an expressway routing node in the region.

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22. A node in an overlay network, wherein the overlay network is a logical representation of a physical network, the node comprising:

means for selecting a target node in a target region in the overlay network;

means for determining a network condition to be monitored by the target node;
and

means for receiving a notification from the target node including a map for the region, wherein the map includes locations of nodes physically close in the physical network.

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23. The node of claim 22, further comprising:

means for determining first proximity information associated with a location of the node in the network;

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means for searching through the map using the first proximity information;
and

means for identifying a routing node in the target region based on the searching through the map, wherein the routing node is a node in the target region physically closest to the node relative to other nodes in the region.

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24. The node of claim 23, wherein the node comprises means for storing a routing table, wherein the routing table includes information identifying the routing node.

25. The node of claim 22, wherein the notification further includes at least one measured network metric, and the means for identifying a routing node is operable to identify the routing node based on the at least one measured network metric.

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